United States Patent

[11] **3,568,587**

[72] Inventor **Jerome D. Laval**
491 W. Escalon, Fresno, Calif. 93704

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[54] **PHOTOGRAPHIC PAPER FEEDING ATTACHMENT FOR PROCESSOR**
5 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **95/90.5**
[51] **Int. Cl.** **G03d 1/14**
[50] **Field of Search** 95/4.5, 90, 90.5

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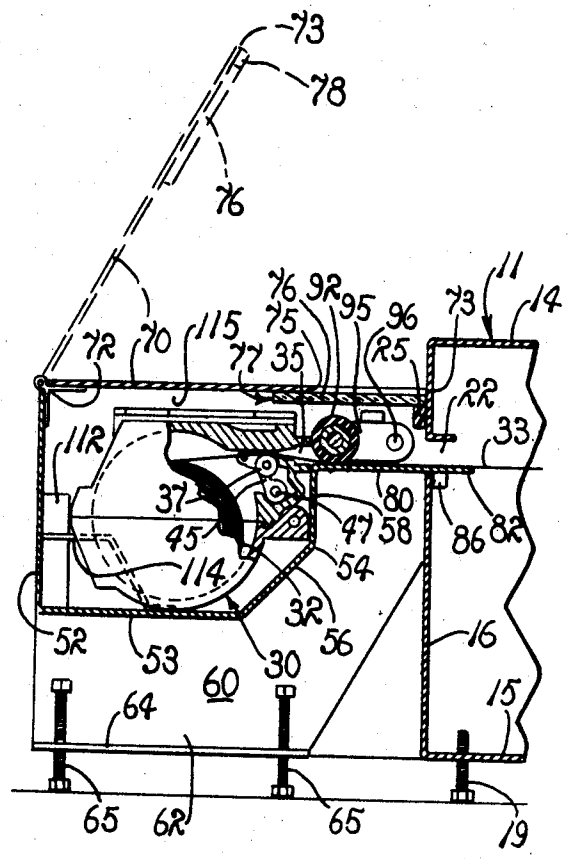
Primary Examiner—John M. Horan
Assistant Examiner—Monroe H. Hayes
Attorney—Huebner & Worrel

ABSTRACT: An attachment for feeding exposed photographic paper from a cassette loaded with such paper to an automatic processor providing a light-impervious housing adapted to receive such a cassette and precisely to locate it in paper-feeding position with respect to the processor and paper drive components within the housing manipulatable externally thereof initially to feed the paper into the processor without further exposing the paper during such travel.



2 Sheets-Sheet 1

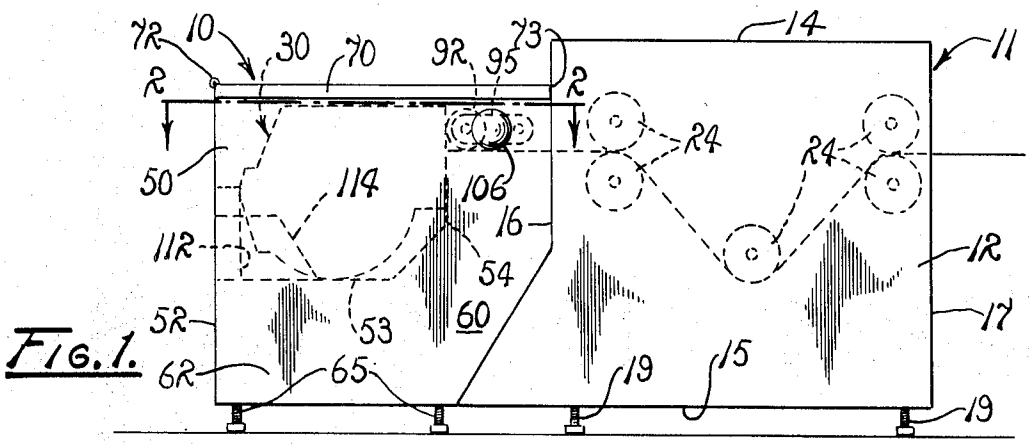


FIG. 1.

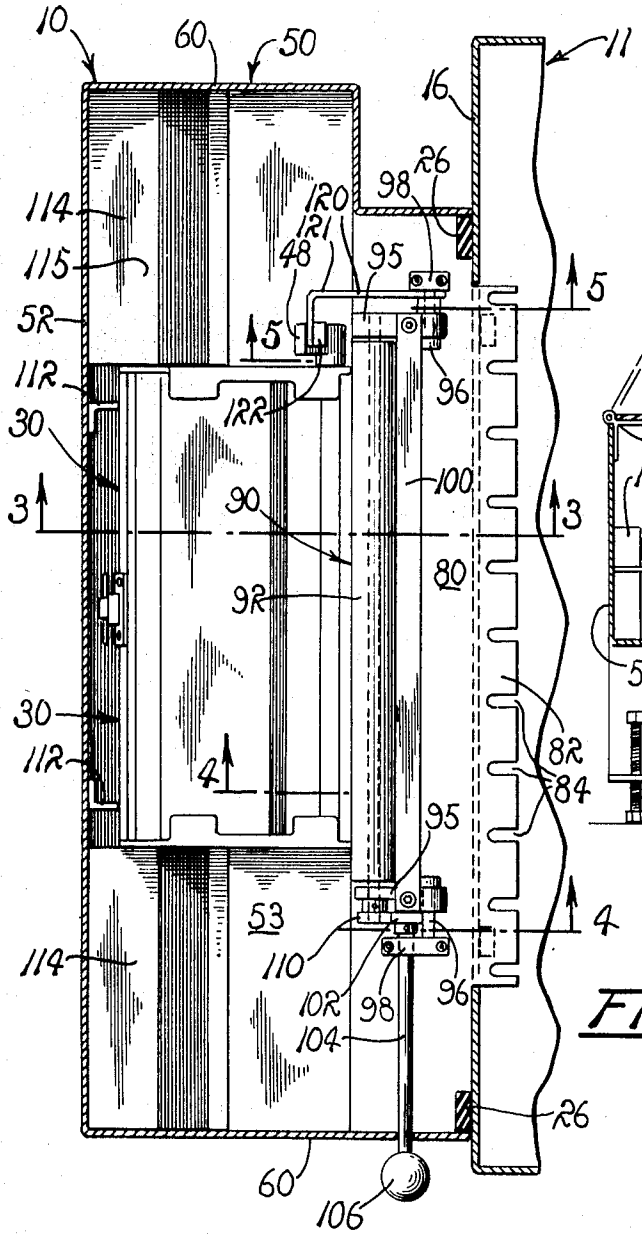


FIG. 2.

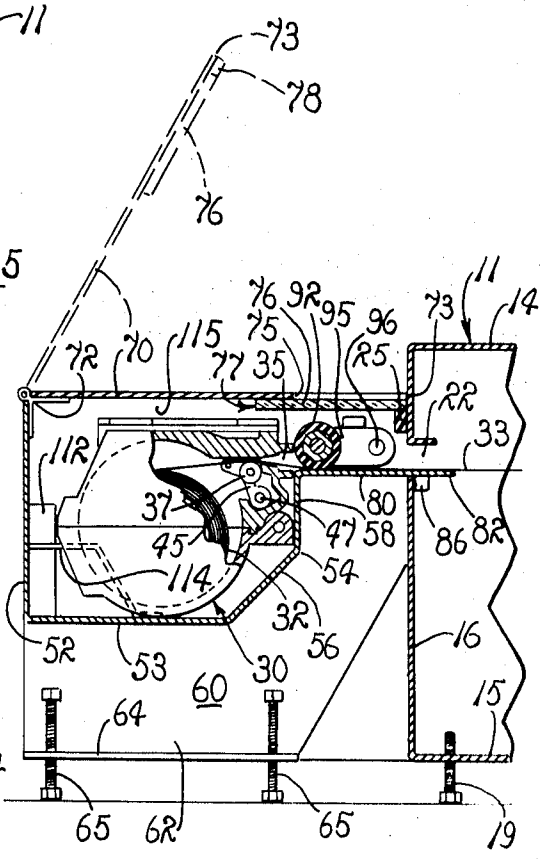


FIG. 3.

JEROME D. LAVAL
INVENTOR

Hubner & Horel
ATTORNEYS

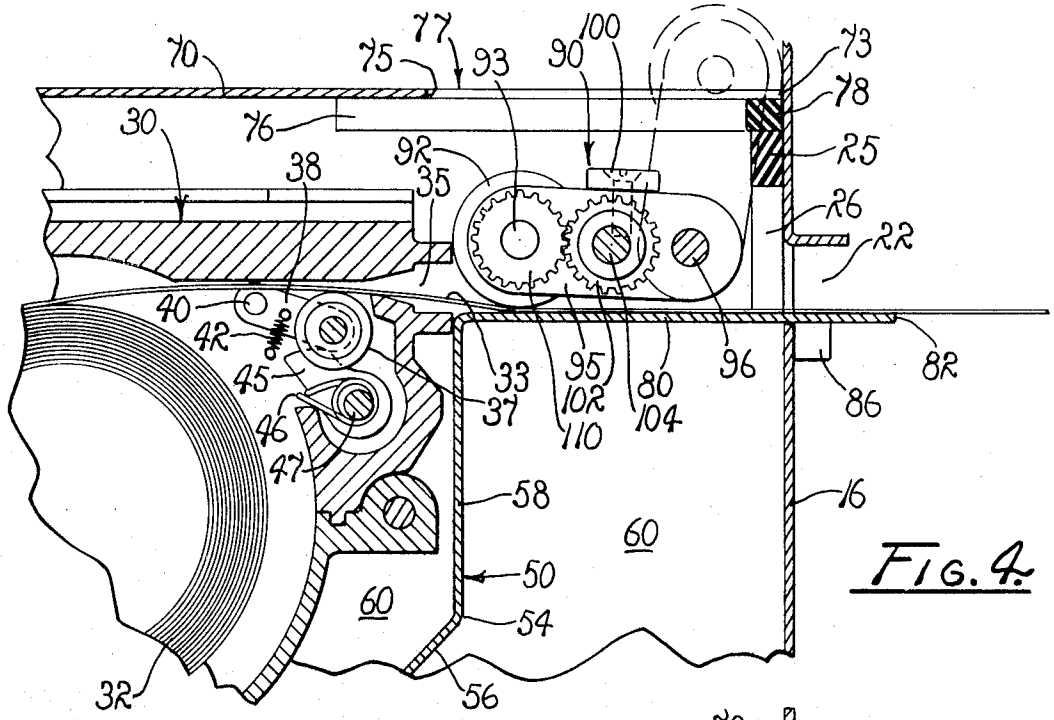


FIG. 4.

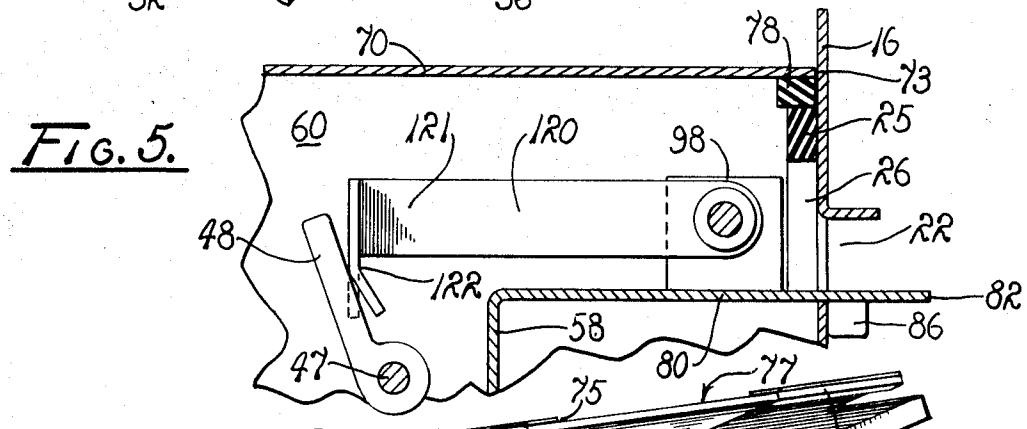


FIG. 5.

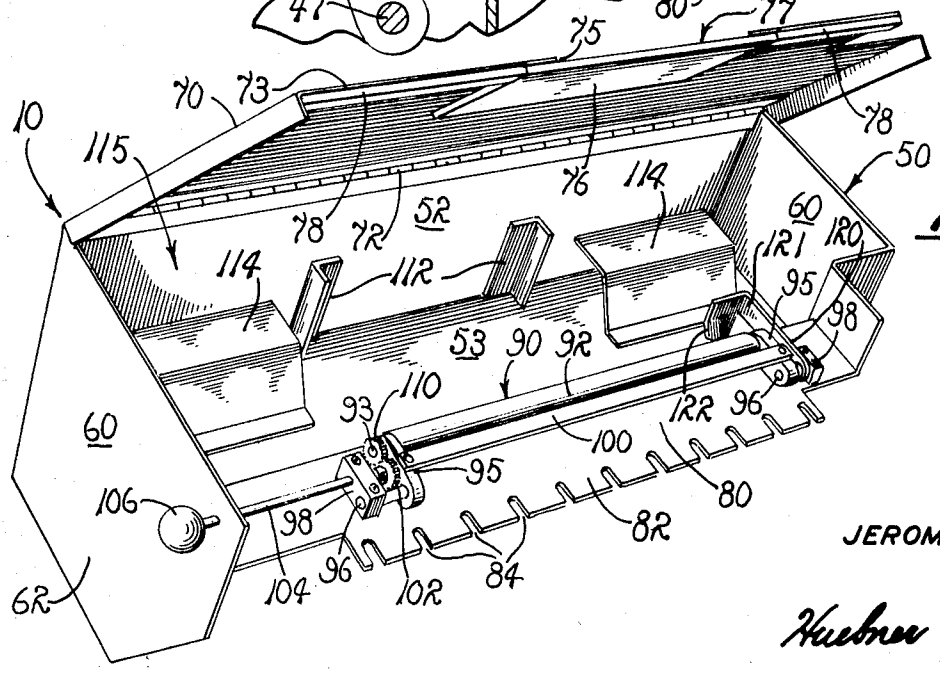


FIG. 6.

JEROME D. LAVAL
INVENTOR

Kuebler & Morel
ATTORNEYS

PHOTOGRAPHIC PAPER FEEDING ATTACHMENT FOR PROCESSOR

BACKGROUND OF THE INVENTION

In the photo type-setting art, rolls of light-sensitive photographic paper are employed in enclosed containers commonly known in the trade as "cassettes." The paper is exposed in a type-setting machine and is fed into such a cassette within the machine during the composing operation. A leader portion of the roll of sensitized paper is outwardly extended from a sealed slot in the cassette by which the paper can be gripped for subsequent withdrawal and processing. Ordinarily, the exposed paper must be withdrawn from the cassette in a dark room to preclude further inadvertent exposure. This requires that the roll of exposed paper be completely removed from the cassette and developed by hand manipulation through a series of trays of developing solution. More recently, automatic processors have been employed which, however, still require that the leader portion of the roll of sensitized paper be hand fed into the processor. This must also be done in a dark room because of the exposure of the paper during its travel between the cassette and the processor.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an attachment for automatically feeding exposed photo type-setting paper from a storage cassette into an automatic processor.

Another object is to provide such an attachment which permits such feeding operation to be accomplished in a lighted room.

Another object is to provide an attachment of the character described which may be quickly and conveniently mounted in light-sealing relation on an automatic processor for photo type-setting paper.

Another object is to provide an attachment for a photo type-setting processor which is adapted to receive and to enclose a variety of sizes of photo type-setting cassettes.

Another object is to provide an attachment for a photo type-setting processor which is capable of dependably withdrawing the sensitized paper from the cassette and feeding it into the processor in a lighted room with virtually no danger of further exposing the paper during the feeding operation.

Another object is to provide an attachment for a photo type-setting processor which utilizes a paper drive mechanism and eliminates hand manipulation of the paper during the removal and feeding of the paper from the cassette to the processor.

Other objects and advantages of the present invention will subsequently become more clearly apparent upon reference to the following description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of an attachment embodying the principles of the present invention connected to a photo type-setting processor showing in dashed lines a cassette disposed within the attachment and the path of travel of the paper from the cassette through the processor.

FIG. 2 is a somewhat enlarged horizontal section through the attachment, taken generally along the line 2–2 of FIG. 1, showing the cassette disposed within the attachment in top plan and including a fragmentary section of the attachment face of the processor.

FIG. 3 is a somewhat enlarged transverse vertical section through the attachment, cassette and processor, taken generally along the line 3–3 of FIG. 2.

FIG. 4 is a further enlarged transverse vertical section through a paper-locking mechanism for the cassette and a paper-driving mechanism for the attachment, taken generally along the line 4–4 of FIG. 2.

FIG. 5 is a further enlarged transverse vertical section, taken generally along the line 5–5 of FIG. 2, showing an actuating cam arm for the cassette-locking mechanism in side elevation.

FIG. 6 is a perspective view of the attachment of the present invention removed from the processor and without the cassette of the preceding FIGS.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawings, an attachment, generally indicated by the reference numeral **10**, embodying the principles of the present invention is shown connected to a photo type-setting sensitized paper processor **11**. The processor includes an enclosed housing **12** providing continuous top and bottom walls **14** and **15**, respectively, and opposite front and rear walls **16** and **17**, respectively. A plurality of leveling legs **19** are screw threadably extended through the bottom wall **15** for leveling the housing. An elongated substantially horizontally disposed relatively narrow paper-receving slot **22** is formed in the front wall **16** of the processor housing in closely adjacent spaced relation to the top wall **14**. A plurality of paper drive rollers **24** are disposed within the processor housing to travel the paper through a plurality of trays, not shown, containing developer solution with the drive rollers discharging the paper after processing through a slot, not shown, in the rear wall **17** of the housing. An elongated light-sealing strip of a suitable resilient material is secured to the front wall **16** of the housing in coextensive relation along the upper edge of the paper-receiving slot **22**. The strip includes opposite depending end portions **26** at opposite ends of the slot which terminate in substantially aligned relation with the lower edge of the paper-receiving slot.

As best shown in FIGS. **1** and **2**, a sealed container or cassette **30** is adapted to be received within the attachment **10**. The cassette is loaded with a roll of exposed photographic paper **32** which has a leader end **33** extended outwardly a short distance from the cassette through a paper discharge slot **35**. The entrance of light through the paper discharge slot into the cassette is precluded by an elongated cylindrical seal roll **37** normally disposed in blocking relation to the slot. The seal roll is mounted for pivotal swinging movement upon a pair of endwardly disposed arms **38** which are pivotally mounted within the cassette on pins **40**. As best show in FIG. **4**, the seal roll is biased to a slot-opening position by a tension spring **42** connected at one of its ends to one of the arms **38** and at at its opposite end to a wall of the cassette. A roll blocker arm **45** is rotatably mounted within the cassette beneath the seal roll to urge the roll upwardly to a slot-blocking position. A helical torsion spring **46** is mounted about a support shaft **47** for the blocker arm which is sufficiently strong to overcome the force of the spring **42** of the seal roll normally to dispose the roll in said slot-blocking position. The mounting shaft is extended laterally outwardly of the cassette to mount an actuating arm **48**, as shown in FIG. **5**.

The attachment **10** of the present invention is adapted to receive and to position the cassette **30** in a paper-feeding position with respect to the processor **11**. The attachment provides an elongated substantially rectangular housing **50** constructed of a substantially rigid sheet metal material. As best shown in FIG. **6**, the attachment housing includes an elongated substantially rectangular back panel **52**, a continuous bottom panel **53**, and a front panel **54** having an angularly upwardly extended portion **55** and a continuous substantially vertical portion **58** disposed in spaced substantially parallel relation to the back panel **52**. The attachment housing includes a pair of opposite end plates **60** which are disposed in endward covering relation to the back, bottom and from panels of the housing and which are rigidly secured thereto, as by welding or the like. The end plates include lower depending leg portions **62** providing inwardly extended flange portions **64**. A plurality of support bolts or feet **65** are screw threadably received through the flange portion **64** of the legs in order

precisely to level the attachment housing with respect to the processor 11.

A cover 70 of substantially rigid sheet metal material is mounted for pivotal swinging movement on the upper edge of the back panel 52 by a piano-type hinge 72. The cover has an opposite forward edge 73 having a substantially rectangular opening 75 formed therein over which is mounted a panel 76 of red-colored plastic material to provide a viewing window 77 for observing the passage of the photographic paper 32 thereunder. An elongates strip of resilient seal material 78 is secured to the underside of the forward edge 73 of the cover on opposite sides of the viewing window for engagement with the seal strip 25 upon the front wall 16 of the processor housing 12.

An elongated substantially flat paper feed plate 80 is forwardly extended from the upper edge of the front panel 54 of the attachment housing in downwardly spaced substantially parallel relation to the upper edge of the end plates 60 and to the cover 70 when it is disposed in its closed position of FIG. 3. The feed plate has a ledge portion 82 outwardly extended from the attachment housing which includes a plurality of notches 84 for accommodating a plurality of fingers, not shown, disposed within the processor housing 12. The ledge 82 of the feed plate, as shown in FIG. 3, is adapted to be extended through the paper-receiving slot 22 in the processor housing. The ledge includes a pair of depending protuberances 86 which are adapted to be disposed in hooking relation to the front wall 16 of the processor housing beneath the lower edge of the receiving slot 22 to maintain the attachment tightly against the front wall.

A photographic paper drive mechanism, generally indicated by the reference numeral 90, is disposed within the attachment housing 50 upon the feed plate 80. The paper drive mechanism includes an elongated drive roller 92 which is mounted for substantially vertical pivotal swinging movement between a position rollably engaging the feed plate, as shown in full lines in FIG. 4, and a position retracted therefrom, as shown in dashed lines. The roller is mounted on an elongated shaft 93 which has opposite ends journaled in the ends of a pair of spaced substantially parallel pivot arms 95. The arms are individually pivotally mounted at their opposite ends by a pair of pivot shafts 96 supported by a pair of spaced bearing blocks 98 secured to the feed plate. An elongated lifting strap or tie bar 100 is extended in interconnecting relation between the roller arms at a point intermediate their ends.

A drive gear 102 is disposed laterally adjacent to one of the roller-mounting arms 95 substantially intermediate its ends. The drive gear is supported on an elongated drive shaft 104 extended through the adjacent arm bearing block 98 and through the adjacent end plate 60 of the attachment housing 50 to provide an outwardly extended end mounting an actuating knob 106. A driven gear 110 is mounted on the roller shaft 93 in coplanar relation with the drive gear and which is adapted to be disposed in meshing relation therewith when the drive roller 92 is disposed in its full line position of FIG. 4 rested upon the paper feed plate 80.

A pair of angled guide rails 112 are secured to the inner surface of the back panel 52 of the attachment housing 50, as by welding or the like, in substantially upstanding spaced parallel relation to each other. A pair of opposite baffle plates 114 are similarly secured to the back and bottom panels of the housing on opposite outer sides of the guide rails. A compartment 115 is thus provided within the attachment housing between the baffles and guide rails and the front panel 54 precisely to receive the cassette 30, as shown in the drawings. The space between the forward portions of the baffles and the front panel 54 defines a somewhat elongated relatively narrow compartment for receiving other types of cassettes.

A lock-releasing arm 120 is pivotally mounted on the pivot shaft 96 of the roller-mounting arm 95 opposite to the arm adjacent to the drive gears 102 for maintaining the paper discharge slot 35 in the cassette in an open feeding position when the cassette is disposed within the attachment housing. The lock release arm provides a swinging distal end 121 having a depending camming ramp portion 122 which is adapted slidably to engage the actuating arm 48 of the seal roll-actuating mechanism within the cassette 30.

OPERATION

The operation of the described embodiment of the subject invention is believed to be readily apparent and is briefly summarized at this point. Prior to use, the attachment housing 50 is disposed in operating position with respect to the processor housing 12 by inserting the ledge 82 of the paper feed plate 80 into the paper-receiving slot 22. As best shown in FIG. 3, the protuberances 86 are disposed in hooking relation over the lower edge of the paper-receiving slot 22 against the front wall 16 of the processor housing. The foot members 65 are manipulated precisely elevationally to dispose the feed plate in a substantially horizontal position rested upon the lower edge of the paper-receiving slot.

The hinged cover 70 of the attachment housing is disposed in an open position for initially placing a cassette 30 containing a roll of exposed photographic paper into the compartment 115 of the housing. The type of cassette shown in the drawings is adapted precisely to be received between the baffles 114, the guide rails 112, and the front and bottom panels of the housing so as to dispose the paper discharge slot 35 in aligned relation with the paper feed plate 80 of the housing and with the paper-receiving slot 32 in the processor housing 12.

In order to permit unrestricted insertion of the cassette 30 into the attachment housing 50, the paper drive roller 92 is swung to the dashed line position of FIG. 4 upwardly against the front wall 16 of the processor housing by gripping the tie bar 100 between the roller pivot arms 95. Accordingly, upon such installation of the cassette, the leader end 33 of the exposed paper is disposed upon the paper feed plate 80. The drive roller is then swung downwardly in a counterclockwise direction about the pivot shafts 96 until its lower periphery is rested upon the leader end 33 of the paper on the feed plate. During such return movement, the teeth of the driven gear 110 engage the teeth of the drive gear 102 which may be rotated a slight amount until precisely meshed upon engagement of the lower periphery of the roller with the paper. It will be further noted that in such position, the rearward periphery of the roller is disposed in sliding engagement with the cassette in light-sealing relation with the paper discharge slot 35 therein.

In order to release the paper for withdrawal from the cassette, the lock release arm 120 within the housing is swung to the position shown in FIG. 5 for engagement of its camming ramp end 122 with the actuating arm 48 of the cassette. Such movement causes the actuating arm to be swung to the left in a counterclockwise direction, as viewed in FIG. 5, to move the blocker arm 45 in the same direction to release the seal roller 37. This permits the spring 42 on the mounting arm 38 to lower the seal roller for releasing the leader end 33 of the paper extended between the roller and the upper surface of the paper discharge slot 35.

The cover 70 of the attachment housing is swung to its closed position, as shown in FIGS. 3 and 4, with the strip 78 of sealing material rested against the seal strip 25 on the front wall 16 of the processor housing 12 above the paper-receiving slot 22. This insures against the penetration of any undesirable light rays into the housing to preclude any further exposure of the photographic paper during its travel along the paper feed plate 80 between the paper discharge slot 35 in the cassette 30 and the paper-receiving slot 22 in the processor housing 12. The actuating knob 106 of the paper drive mechanism 90 is rotated in a clockwise direction, as viewed in FIG. 1, to rotate the drive gear 102 in the same direction for driving the driven gear 110 of the paper drive roller 92 in an opposite counterclockwise direction. The lower periphery of the drive roller, in contact with the leader end 33 of the paper, frictionally drives

the paper along the feed plate in a direction from left to right, as viewed in FIG. 4, from the paper-discharge slot 35 in the cassette 30 toward the paper-receiving slot 22 in the processor housing 12 with such movement being observable through the viewing window 77 in the cover 70.

It will be noted that during rotation of the actuating knob 106 in the described direction, the drive gear 102 has a tendency to lift the driven gear 110 and the drive roller 92 to preclude any binding of the roller against the paper on the feed plate 80. Such lifting effect is provided by the eccentric mounting of the drive roller pivot arms 95 with respect to the axis of the drive gear 102 and drive shaft 104.

In the event that the actuating knob 106 is initially inadvertently rotated in the opposite direction, the leader end 33 of the paper is driven in a reverse direction toward the paper-discharge slot 35 in the cassette 30. Complete reentry of the paper into the cassette is, however, precluded by the eventual engagement of the lower periphery of the drive roller with the paper feed plate 80. Such opposite drive is only easily accomplished so long as the lower periphery of the drive roller is engaging the paper upon the feed plate. As soon as the paper runs passed the roller, however, the roller engages the stationary surface of the feed plate and is pressed more tightly against the feed plate to impose a greater drag or restriction upon movement which is noticeably communicated through the drive shaft 104 and the actuating knob 106 to the operator. Accordingly, the operator is afforded an immediate indication that he is rotating the actuating knob in the wrong direction to feed the paper from the cassette toward the processor.

When the actuating knob 106 is manipulated in the correct manner, the leader end 33 of the photographic paper is traveled through the paper-receiving slot 22 in the processor housing 12 and between the first set of paper drive rollers 24 therein. As described, the drive rollers 24 within the processor housing are power driven for movement of the paper through the processor with the paper being subsequently discharged rearwardly through a slot, not shown, in the rear wall 17 thereof. As soon as the leader end 33 is caught by the first set of drive rollers within the processor housing, the manual drive mechanism 90 of the attachment housing is permitted to freewheel so as not to impose any restriction on the withdrawal of the paper from the cassette along the paper feed plate 80 and into the processor housing. As soon as the actuating knob ceases to rotate, such stopping provides a visual indication to the operator that the paper is completely exhausted from the cassette and the cover 70 may be safely opened to remove the empty cassette. This is easily accomplished by swinging the paper drive mechanism, including the drive roller 92, upwardly to the dashed line position of FIG. 4 and by similarly swinging the lock-releasing arm 120 upwardly to a position permitting unrestricted removal of the cassette.

In view of the foregoing, it is readily apparent that the structure of the present invention provides an improved attachment for automatically feeding exposed photo type-setting paper from an enclosed cassette into an automatic photo type-setting paper processor. The entire operation can be accomplished in a fully lighted room with virtually no possibility that the paper will be further exposed during the feeding operation of the paper between the cassette and the processor. The attachment of the present invention completely eliminates any hand manipulation of the paper during its removal from the cassette and during the feeding operation of the paper into the processor. Furthermore, the attachment housing is adapted to accommodate a variety of different types of cassettes and precisely to position each one in optimum feeding relation to the photographic processor.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

I claim:

1. An attachment, for feeding exposed photographic paper from an enclosed cassette loaded with such paper to a processor disposed within a room containing light with the paper having a leading end outwardly extended from the cassette and with said processor having a paper guide mechanism disposed therein, comprising a light impervious housing adapted to receive such a tape cassette and to locate said leading end of the paper in a feeding position with respect to the processor; paper feed means disposed within the housing in bridging relation between the cassette and the processor upon which said paper is permitted to travel; a drive roller within the housing having a lower periphery in frictional driving relation to said paper upon the feed means; drive means operationally associated with said drive roller being manipulatable externally of the housing for initially feeding the paper into the processor until caught by said drive mechanism within the processor; and means pivotally mounting said roller on said feed means eccentrically of said drive means for swinging movement between a position rested upon the feed means and a position spaced therefrom permitting relatively free rotation of the roller in a direction tending to lift the roller from said feed means to feed said paper from the cassette toward the processor but restricting rotation of the roller in the opposite direction tending to force the roller against the feed means to preclude reverse travel of said paper toward the cassette.

2. The attachment of claim 1 in which said roller-mounting means includes a pair of elongated spaced substantially parallel arms individually having opposite pivot and swinging ends, a shaft having ends rotatably journaled in said swinging ends of the arms rotatably mounting said roller therebetween, support means on said feed plate pivotally mounting said pivot ends of the arms for free-floating rolling engagement of the roller upon said feed plate and for permitting said swinging movement of the roller away from the feed plate, and roller drive means having a control end outwardly extended from the housing and an inner end within the housing, a roller drive member mounted on said inner end of said drive means laterally adjacent to one of said arms eccentrically between its pivot and swinging ends, and a driven member mounted on said roller shaft for engagement with said drive member when the roller is rested against said feed plate.

3. An attachment, for feeding exposed photographic paper from an enclosed cassette loaded with such paper to a processor disposed within a lighted room with the paper having a leading end outwardly extended from an elongated paper discharge slot in the cassette and with said processor having an elongated paper-receiving slot and a paper drive mechanism disposed therein, comprising a light impervious housing having a compartment adapted to receive such a cassette therein; baffle means within the housing precisely locating the cassette to dispose said paper discharge slot therein in spaced aligned relation with the paper receiving slot in the processor; a substantially flat paper feed plate disposed in bridging relation between said slots in the cassette and in the processor and having a portion extendible through said slot in the processor in hooking relation to preclude inadvertent separation of the attachment therefrom; an elongated paper drive roller within the housing; a pair of elongated spaced substantially parallel arms having pivot ends pivotally mounted on said feed plate and opposite swingable ends; an elongated shaft having ends rotatably journaled in said swinging ends of the arms rotatably mounting said roller therebetween for movement between a position with the roller rested upon said feed plate and a position outwardly disposed therefrom; and roller drive means having a control end outwardly extended from the housing and an inner end adapted drivingly to engage one of said ends of the shaft when the roller is rested against said feed plate freely to rotate the roller in a direction tending to lift the roller from the feed plate to feed said paper from the cassette toward said processor but restricting rotation of the roller in the opposite direction tending to press the roller tightly against the feed plate to preclude reverse travel of the paper toward the cassette.

4. The attachment of claim 3 in which said roller includes a peripheral portion spaced from said feed plate slidably engaging said cassette in light shielding relation to said slot in the cassette.

5. The attachment of claim 4 wherein said cassette provides an internal light-sealing mechanism normally closing said paper discharge slot to preclude inadvertent exposure of said photographic paper therein and having an outwardly extended actuating arm, and an elongated lever pivotally mounted within the housing having a camming ramp end slidably engageable with said actuating arm of the cassette for manipulating the same to open said paper discharge slot in the cassette when the cassette is disposed within the housing in a position to feed said photographic paper into the processor.